1   ABSTRACT

2   FULLY SECURE MESSAGE TRANSMISSION OVER NON-SECURE CHANNELS

3   WITHOUT CRYPTOGRAPHIC KEY EXCHANGE

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5   A cryptographic system transmits a fully secure cryptographic message over a non-secure

6   communication channel without prior exchange of cryptographic keys using a three-pass

7   protocol. The transmitting agent initiating the communication embodies the message for

8   the designated receiving agent in the composite output of two distinct transformations

9   such that a generalized reversal of the combined transformations cannot be determined

10   from that output. That output is transmitted as a first-pass over a non-secure channel to

11   the receiving agent. The receiving agent generates a second composite output by

12   transforming the received message such that a generalized reversal of this second

13   combined transformation cannot be determined from that resulting output. That second

14   output is transmitted as a second-pass over a non-secure channel to the initial transmitting

15   agent. The initial agent generates a third composite output from the returned message by

16   reversing one of the two initial transformations such that a generalized reversal of this

17   third composite transformation cannot be determined from that resulting output. The

18   third output is transmitted as a third-pass over a non-secure channel to the receiving

19   agent. The receiving agent uses a reversal of the second transformation applied to the

20   final message to extract the initial message. The transformations (or keys) used by either

21   party need not be known by the other, making this an independent-key cryptographic

22   process. It is technically impossible for any eavesdropping agent, even one who captures

1   all transmissions between the transmitting and receiving agents, to directly recreate the

2   initial message from the observed transmissions.

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